

A comparison of the morphological and biochemical characteristics of *Chlorella sorokiniana* and *Chlorella zofingiensis* cultured under photoautotrophic and mixotrophic conditions

ABSTRACT

The responses of two species of microalgae, *Chlorella sorokiniana* and *Chlorella zofingiensis*, were compared regarding their morphological and biochemical properties under photoautotrophic and mixotrophic conditions. These microalgae were cultured under both conditions, and their crude ethanolic extracts were examined for their pigment and total phenolic contents. In addition, the microalgae's antioxidant activities were determined using a DPPH radical scavenging assay and a ferric reducing antioxidant power (FRAP) assay. Both strains showed increases in cell size due to the accumulation of lipid bodies and other cell contents, especially carotenoids, under the mixotrophic condition. Notably, reductions in phenolic and chlorophyll contents were observed to be associated with lower antioxidant activity. *C. zofingiensis* compared with *C. sorokiniana*, demonstrated higher antioxidant activity and carotenoid content. This study showed that different species of microalgae responded differently to varying conditions by producing different types of metabolites, as evidenced by the production of higher levels of phenolic compounds under the photoautotrophic condition and the production of the same levels of carotenoids under both photoautotrophic and mixotrophic conditions.

Keyword: Antioxidant activity; Carotenoid content; *Chlorella sorokiniana*; *Chlorella zofingiensis*; Pigments content; Total phenolic content